



PCT/GB 2003/534204
Rec'd PCT/PTO 16 MAY 2005

INVESTOR IN PEOPLE

The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ



I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.

PRIORITY DOCUMENT

SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH RULE 17.1(a) OR (b)

Signed

Dated

7 January 2004

BEST AVAILABLE COPY

THE PATENT OFFICE
J
13 DEC 2002
RULE 97
NEWPORT

1/77

16DEC02 E771174-1 D02835
P01/7700 0.00-0229218.3

Request for grant of a patent

(see the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road, Newport
South Wales NP9 1RH

1. Your reference	GJA/P400590		
2. Patent application number (The Patent Office will fill in this part)	13 DEC 2002		0229218.3
3. Full name, address and postcode of the or of each applicant (underline all surnames)	RICHARD J THOMPSON 7 HOLYWOOD WOLSINGHAM BISHOP AUCKLAND CO DURHAM DL13 3HE		
05524525001 Patents ADP number (if you know it)			
If the applicant is a corporate body, give the country/state of its incorporation			
4. Title of the invention	CONDUIT JUNCTION WITH INTERNAL EARTH		
5. Name of your agent (if you have one)	URQUHART-DYKES & LORD		
"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)	ST NICHOLAS CHAMBERS AMEN CORNER NEWCASTLE UPON TYNE NE1 1PE		
Patents ADP number (if you know it)	00001644019 ✓		
6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and the or each application number	Country	Priority application number (If you know it)	Date of filing (day/month/year)
7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application	Date of filing (day/month/year)	

8. ☐ statement of inventorship and or right to grant of a patent required in support of this request? (Answer "Yes" if:)
 a) any applicant named in part 3 is not an inventor, or
 b) there is an inventor who is not named as an applicant, or
 c) any named applicant is a corporate body;
 see note (d)
- NO

9. Enter the number of sheets for any of the following items you are filing with this form.

Do not count copies of the same document

Continuation sheets of this form

Description 8

Claim(s) 2

Abstract

Drawing(s) 7

- 10 If you are also filing any of the following items state how many against each item:

Priority documents

Translation of priority documents

Statement of inventorship and right to grant of a patent (patents form 7/77)

Request for preliminary examination and search (patents form 9/77)

Request for substantive examination (patents form 10/77)

Any other documents (please specify)

11

I/We request the grant of a patent on the basis of this application.

Signature

Date 11 December 2002


 URQUHART-DYKES & LORD

- 12 Name and daytime telephone number of person to contact in the United Kingdom

GRAHAM ARCHER - 0191 2618573

Conduit Junction with Internal Earth

The present invention relates to a junction for joining sections of conduits having an internal earth and particularly, but not exclusively, to such junctions for use in environments where hygiene is of paramount importance.

Figure 1 shows an example of a metal junction used for connecting lengths of conduit also of metal. The conduit used with this junction are of circular cross section and are not shown in this figure. The junction 10 has a body 12 having first and second connecting portions 14 and 16 for connecting sections of conduit to the junction 12. In use, a cable 18 is inserted along the conduit sections and through connecting portions 14 and 16. A further cable, being an earth cable, (not shown) is also passed through body 12 and is attached in electrical contact with an earthed connecting means 20 which is formed from a base portion 22 which has a threaded aperture, a washer 24 and a fixing screw 26. Typically a short length of the plastic protective coating which surrounds the earth cable is removed and the cable is wrapped around screw 26 and fixed into position. Once all of the cables are in position lid 28, with sealing gasket 30, is located on body 12 and screws 32 are inserted through unthreaded holes 34 and into threaded holes 36 so as to fix lid 28 to body 12.

This type of junction suffers from the disadvantage that it is not at all compact and being circular in shape takes up a considerable volume when placed next to other objects. For example, if placed in a corner between two connecting walls and a ceiling, significant spaces are left between the junction and the walls. These spaces attract dirt and prove difficult to clean, and therefore in industries where hygiene is of paramount importance such a junction would prove unsuitable for this type of location.

An alternative junction 50 is shown in figure 2. This junction 50 has a body 52 having connection portions 54 and 56. The junction 50 also has a lid 68 which is attached to body 52 by screws 72 passing through unthreaded holes 74 and into threaded holes 76. This form of junction is preferred in some industries due to its more compact dimensions. Specifically the junction is typically around twice as thick and tall as the diameter of the cross section of the conduit it joins. However, it maintains a large internal volume by having a greater length than the junction 10 of figure 1. However, it is not possible to provide the junction 50, used in the junction of figure 2, with an internal earthing connection, such as that shown in figure 1, since this would obstruct the cables in body 52 and may prevent them from passing through junction 50 as they are fed through the adjoining conduit sections. As a result, external earthing systems are used where an earthed wire extends externally along the path of the conduit sections and is occasionally clamped using external clamping means to the outside of the conduit sections.

In many industries such an arrangement is satisfactory, if somewhat unattractive. However, as previously mentioned, in some industries hygiene is of paramount importance. For example, in the food, beverage or pharmaceutical industries it is of vital importance that the external surfaces of any conduit system are easy to clean. Typically these conduit systems are made from stainless steel and as many surfaces as possible are smooth and easy to clean. As a result, an externally clamped earthed wire would be entirely unsuitable as this would create a significant number of dirt traps and prove extremely difficult to clean.

Preferred embodiments of the present invention seek to overcome the above described disadvantages of the prior art.

According to the present invention there is provided a junction for joining at least one first section of conduit to at least one second section of conduit, the junction comprising:-

a body, having at least one first connecting portion for connecting a respective first section of conduit to said body and at least one second connecting portion for connecting a second respective section of conduit to said body, the body defining a volume extending between at least one said first connecting portion and at least one second connecting portion, and having at least one aperture allowing access to said volume;

at least one lid adapted to close the or each aperture; and

at least one earth connecting means located within said body and having at least one channel adapted to receive at least one earthed electrical cable in electrical contact with said body.

By providing a conduit junction with an internal earth connection in the form of a channel adapted to receive one or more earthed cables, the advantage is provided that a slim junction, generally having a width around twice the diameter of the conduit sections, can be provided with an internal earthed connection. By using a channel it is possible to include an earth connecting means without creating an obstruction to the movement of the other cables as they are inserted into the junction. Furthermore, the earthed connection can be located within the junction very close to the path that the earthed cable would naturally be following. As a result it is not necessary to use an excess of earthed cable and the cable does not take up the limited space within the junction.

At least one said connecting portions may be a threaded aperture adapted to receive a respective conduit section of substantially circular cross-section.

In a preferred embodiment, said channel is tubular.

In another preferred embodiment, an upper portion of a cross-section of said channel is open.

By providing the upper portion of a cross section of said channel as open the advantage is provided that a single cable can be used as the earthing cable throughout the conduit system and can be attached in a number of conduit junctions, by simply stripping the plastic coating from a section of cable and laying the stripped section into the open channel. Thus an easy means for earthing the junction is provided making it less likely that junction will be missed out by a person installing the cables and thereby providing the most effective earth protection.

In a preferred embodiment said channel has at least one access aperture.

In another preferred embodiment, said channel has a first access aperture and a second access aperture, said apertures being connected by said channel.

The channel between said first and second access apertures may be substantially linear.

Alternatively, the channel between said first and second access apertures may be substantially U-shaped.

In a preferred embodiment, said electrical contact with said body is maintained by cable retaining means.

The cable retaining means may comprise at least one screw adapted to be received in a respective threaded portion of at least one side of a respective said channel.

Alternatively, the cable retaining means may comprise at least one clamping means adapted to engage said earth cable and press it into contact with said body.

In a preferred embodiment, said body is cast.

In another preferred embodiment, said earth connecting means is cast as a part of said body.

Preferred embodiments of the present invention will now be described, by way of example only, and not in any limitative sense, with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view of a conduit junction of the prior art;

Figure 2 is a perspective view of another conduit junction of the prior art;

Figure 3 is a perspective view of an embodiment of the present invention;

Figure 4 is a plan view of the embodiment of figure 3;

Figure 5 is a perspective view of another embodiment of the present invention;

Figure 6 is a plan view of the embodiment of figure 5;

Figure 7 is a perspective view of a further embodiment of the present invention;

Figure 8 is a plan view of the embodiment of figure 7;

Figure 9 is a perspective view of an embodiment of the present invention;

Figure 10 is a plan view of the embodiment of figure 9;

Figure 11 is a perspective view of another embodiment of the present invention; and

Figure 12 is a plan view of the embodiment of figure 11.

Referring to Figures 3 and 4, a junction 100, for connecting a first section of conduit (not shown) to a second section of conduit (also not shown), has a body 102 and lid 104. Body 102 has a first connecting portion 106 and a second connecting portion 108 and defines a volume 110 between said first and second connecting portions 106 and 108. Body 102 also has an aperture 112 which is covered by lid 104, which has a gasket seal (not shown). The junction is also provided with a pair of earth connecting means 114 which are formed from channels 116 and engaging means 118 in the form of grub screws. Lid 104 is maintained in position on body 102 by use of screws 130 which in use extend through unthreaded holes 132 and into threaded holes 134. Figure 4 also shows wires 136 and 138 which in use are inserted into channels 116.

In use electrical cables are fed through conduit sections which are attached to junction 100 at first and second connecting portions 106 and 108. These cables include at least one earthed cable 136, 138. In this embodiment a single cable, as shown at 138, may be used where short section of the cable casing can be removed and the cable bent and inserted into channel 116 before grub screws 118 are used to retain cable 138 in position and in electrical contact with body 102. This single cable extending

throughout the network of conduit sections provided the most effective earthing means since the smaller the number of breaks and connections in a cable the lower the resistance within the cable and therefore the more effective the earthing will be.

An alternative example would be that of cable 136 which has been cut and is also inserted into channel 116 and retained in position and electrical contact by grub screw 118. A second single cable (not shown) would then be inserted into the other channel 116 and similarly retained by grub screw 118, and would extend through the conduit section to the next junction.

Referring to figures 5 and 6, in which parts common with the embodiment of figures 3 and 4 are denoted by like reference numerals increased by 100, junction 200 has an alternative earth connecting means 214. The earth connecting means 214 is a U-shaped open channel 216 and has a retaining means 218 in the form of a cable retaining means 220 and screw 222 which is inserted into a threaded hole 224 in recessed portion 226.

In use cable 238 is located within junction 200 as previously described and has a short section of casing removed. It is then placed into channel 216, as shown in figure 6, and clamped into position by retaining means 222 which is held in position by screw 220 which is inserted through clamping means 222 into threaded hole 224. The head of screw 220 must remain below the upper surface of body 202 and within recess 226, in order that lid 204 can be retained correctly in position.

Referring to figures 7 and 8, in which parts common with the embodiment of figures 5 and 6 are denoted by like reference numerals increased by 100, body 302 of junction 300 has a U-shaped open channel 316 into which a stripped portion of an earth cable 338 is inserted and maintained in position by retaining

means, in the form of grub screws, 318 which are received in threaded portions 328 of the sides of channel 316.

Referring to figures 9 and 10, in which parts common with the embodiment of figures 7 and 8 are denoted by like reference numerals increased by 100, earth connecting means 414 is located on the base of body 402 and comprises two straight open channels 416 and has retaining means 428, in the form of screw 420 which attaches through clamping means 422 into hole 424 thereby holding cable 438 in electrical contact with body 402. In use, a short section of the casing of cable 438 is removed and the exposed portion of the cable placed in channel 416. The cable is then retained in electrical contact with body 402 with clamping means 422 being pressed into engagement with cable 438 by screw 420.

Referring to figures 11 and 12, in which parts common with the embodiment of figures 9 and 10 are denoted by like reference numerals increased by 100. The earth connecting mean 514 is again located in the base of body 502. A single channel 516 is located therein and a grub screw 518 engages threaded portions 528 of the sides of channel 516 and clamps an exposed portion of cable 538 into electrical contact with body 502.

It would be appreciated by persons skilled in the art that the above embodiments have been described by way of example only, and not in any limitative sense, and that various alterations and modifications are possible without departure from this scope of the invention as defined by the appended claims. For example, where the earth connecting means is located in the base of the body, as shown in figures 9 to 12, the base of body 402 and 502 could be made thicker in order that channels 416 and 516 are recessed into the base of body 402 and 502.

1. A junction for joining at least one first section of conduit to at least one second section of conduit, the junction comprising:-

a body, having at least one first connecting portion for connecting a respective first section of conduit to said body and at least one second connecting portion for connecting a second respective section of conduit to said body, the body defining a volume extending between at least one said first connecting portion and at least one second connecting portion, and having at least one aperture allowing access to said volume;

at least one lid adapted to close the or each aperture; and

at least one earth connecting means located within said body and having at least one channel adapted to receive at least one earthed electrical cable in electrical contact with said body.

2. A junction according to claim 1, wherein at least one said connecting portions is a threaded aperture adapted to receive a respective conduit section of substantially circular cross-section.

3. A junction according to claim 1 or 2, wherein said channel is tubular.

4. A junction according to claim 1 or 2, wherein an upper portion of a cross-section of said channel is open.

5. A junction according to any one of the preceding claims, wherein said channel has at least one access aperture.

6. A junction according to claim 5, wherein said channel has a first access aperture and a second access aperture, said apertures being connected by said channel.

7. A junction according to claim 6, wherein said channel between said first and second access apertures is substantially linear.

8. A junction according to claim 6, wherein said channel between said first and second access apertures is substantially U-shaped.

9. A junction according to any one of the preceding claims, wherein said electrical contact with said body is maintained by cable retaining means.

10. A junction according to claim 9, wherein said cable retaining means comprises at least one screw adapted to be received in a respective threaded portion of at least one side of a respective said channel.

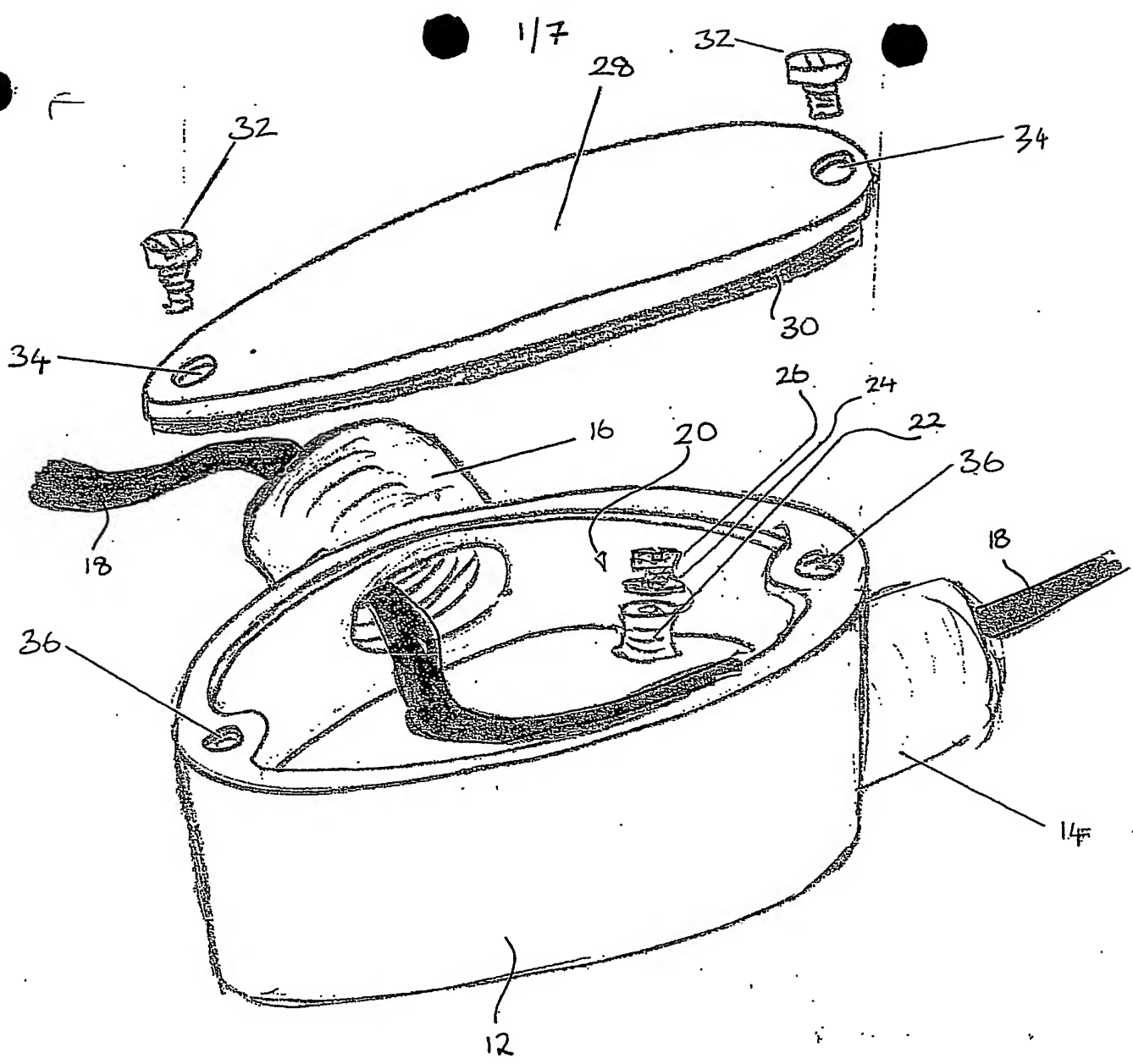
11. A junction according to claim 9, wherein said cable retaining means comprises at least one clamping means adapted to engage said earth cable and press it into contact with said body.

12. A junction according to any one of the preceding claims, wherein said body is cast.

13. A junction according to claim 9, wherein said earth connecting means is cast as a part of said body.

14. A junction for joining at least one first section of conduit to at least one second section of conduit substantially as hereinbefore described with reference to the accompanying drawings.

1/7



10

Fig 1
PRIOR ART

2/7

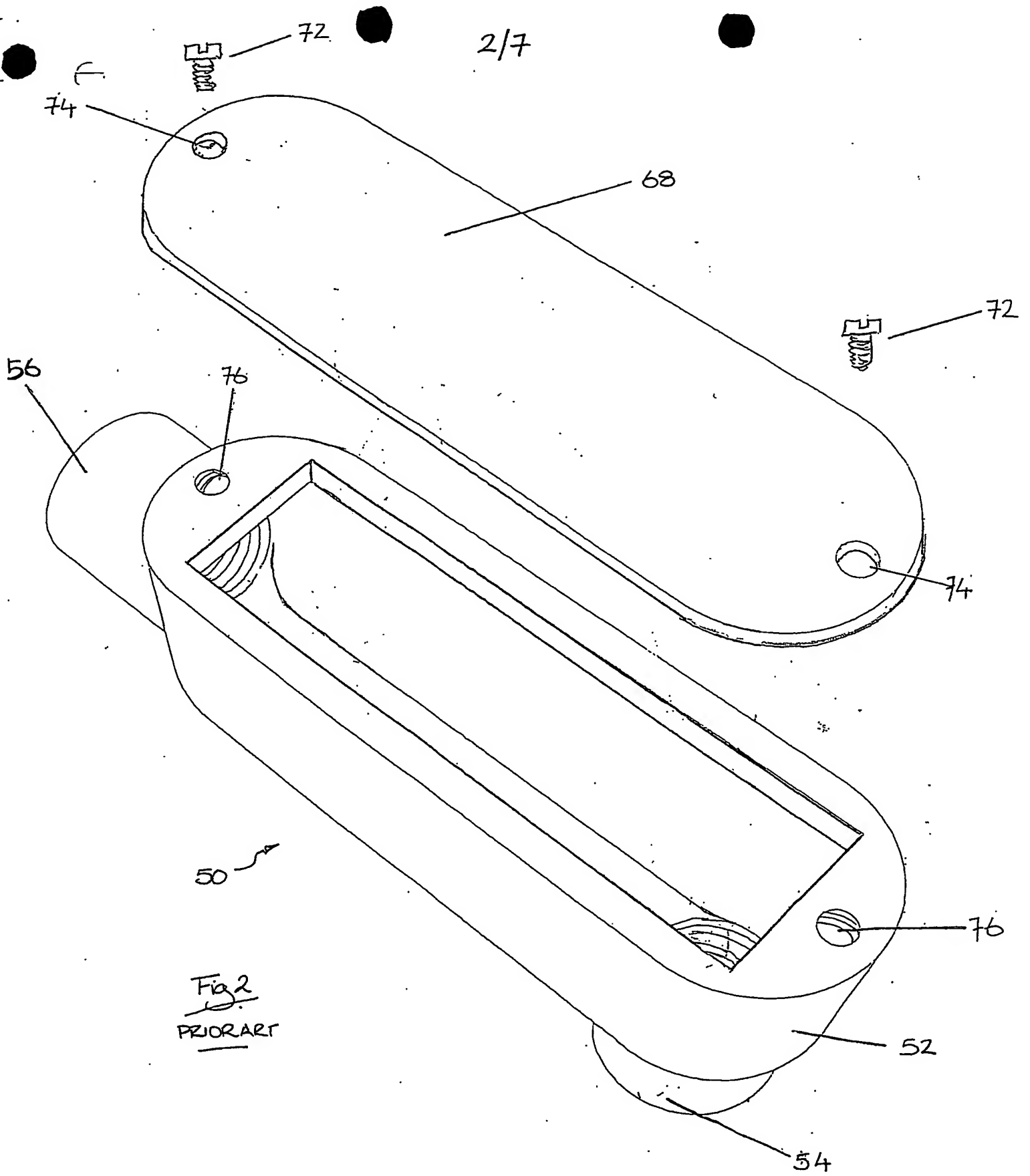
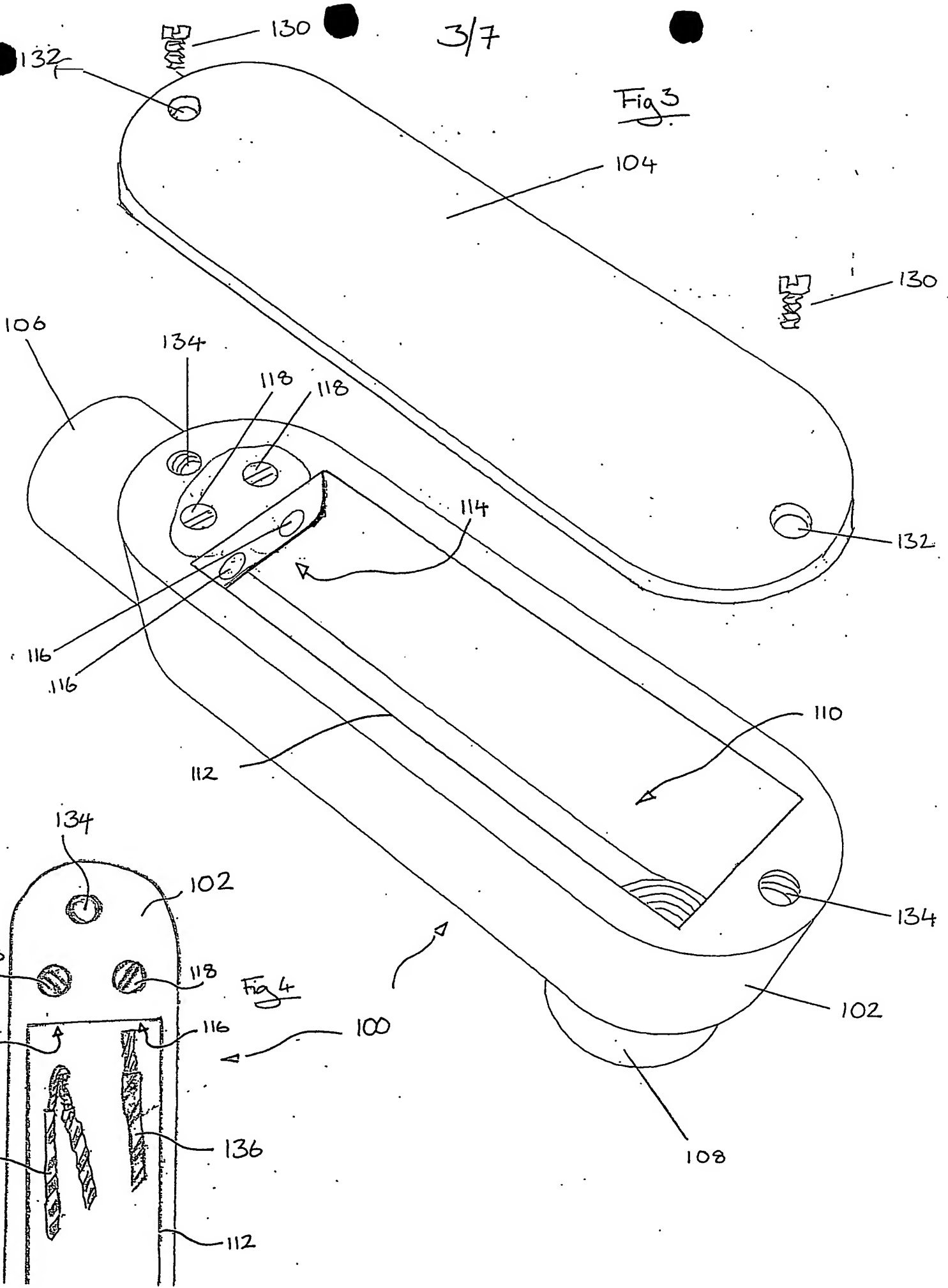


Fig 2
PRIOR ART

Fig 3



4/7

Fig 5

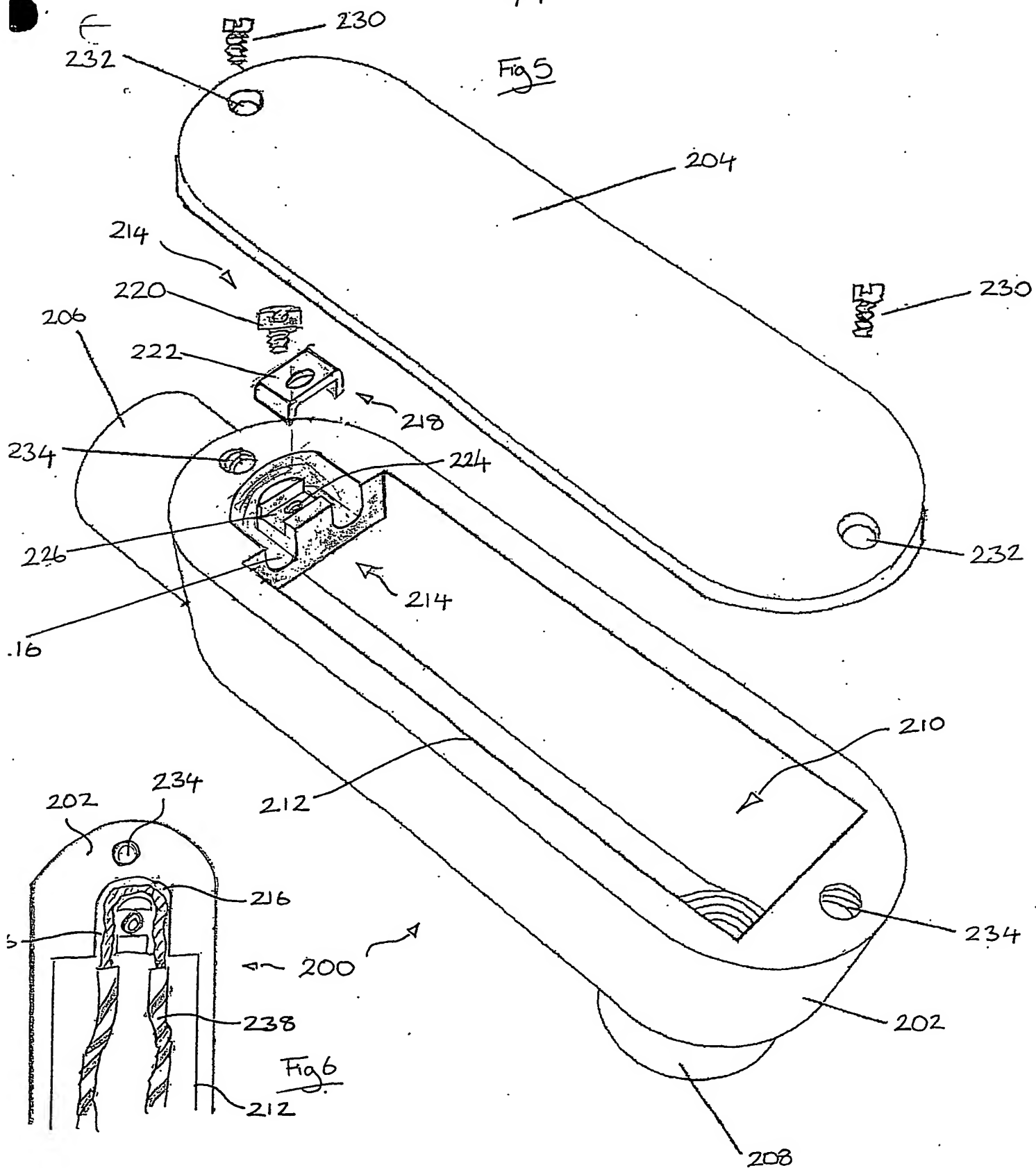
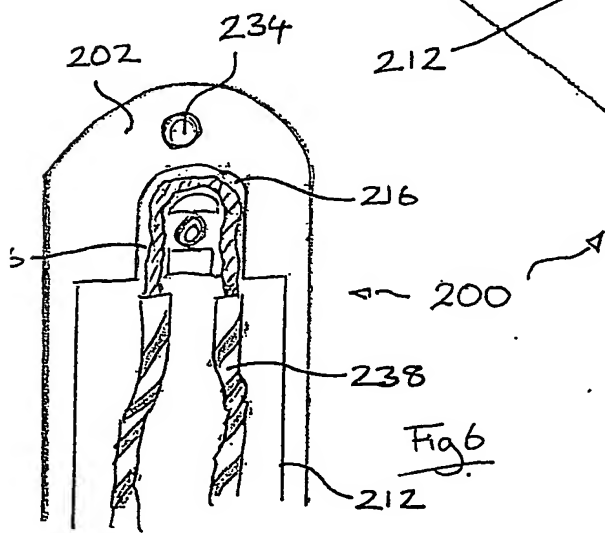
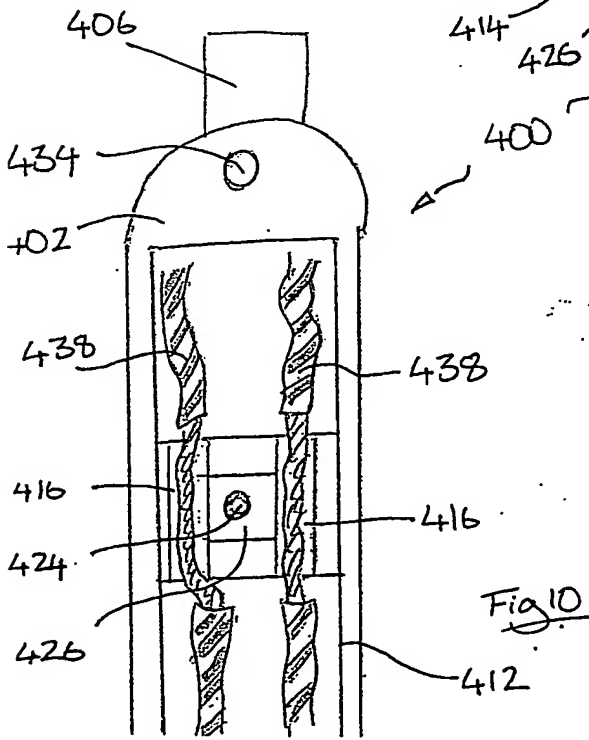
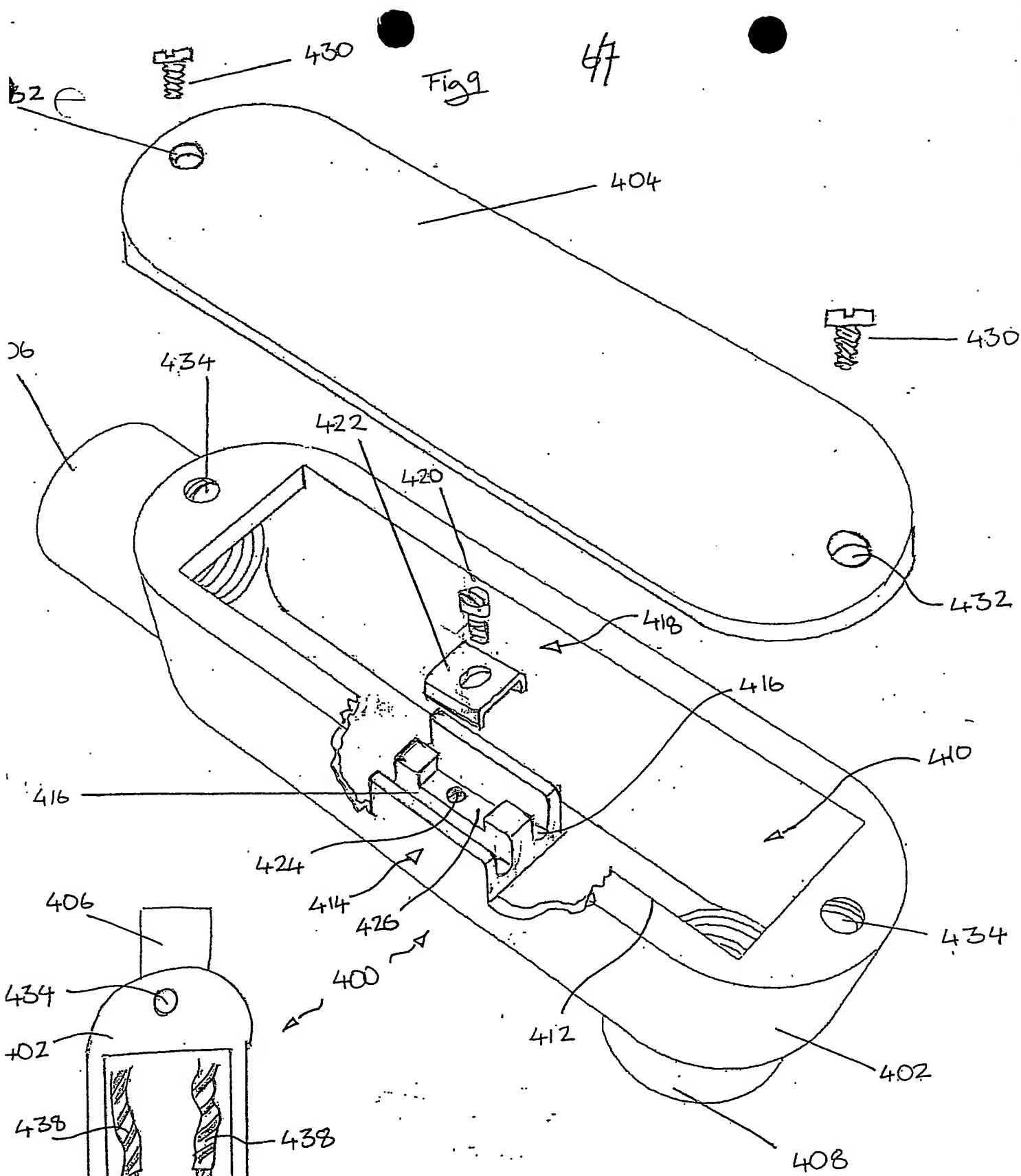
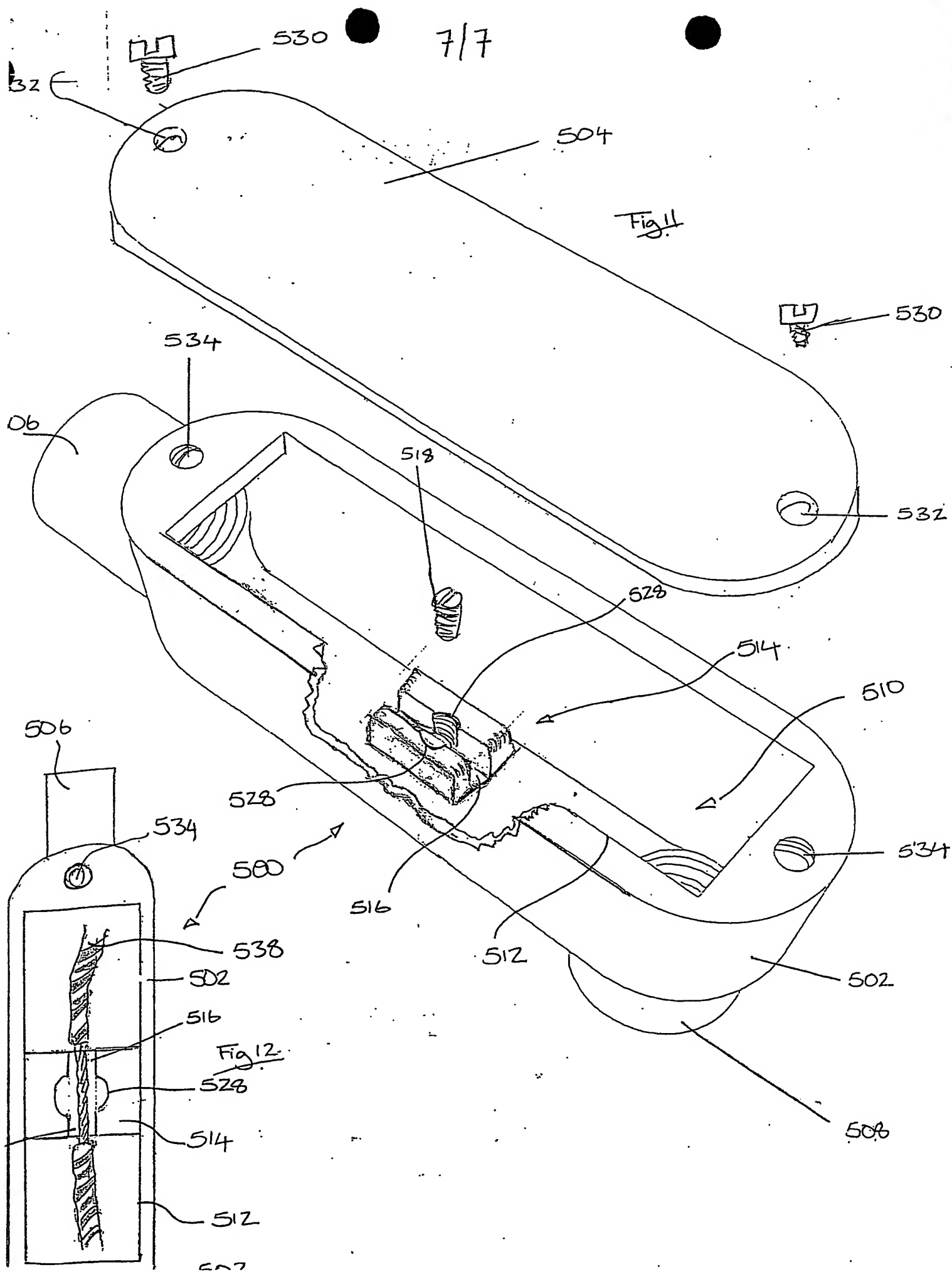


Fig 6







**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☒ **FADED TEXT OR DRAWING**
- ☒ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.